REMARKS

In the present application, claims 1-6 and 19-43 are pending. Claims 1-6 are allowed. The subject matter of Claims 26, 27 and 33-35 has been found to be allowable. Claims 19-25, 28-32, and 36-43 are rejected. Claims 19, 26, 32, and 41 are amended herein. No new matter has been added. As a result of this amendment, claims 1-6 and 19-43 are now believed to be in condition for allowance.

Summary of the Present Invention

In order to facilitate a clear understanding of the differences between the present invention and the teachings of cited art, particularly that of Yamamoto, it is helpful to briefly describe the novel features of the present invention and to provide a context for their application.

The present invention is drawn to the efficient conversion of a full color image into two complimentary buffers comprised of binary data so as to facilitate printing on a two-color printer. While image processing typically requires a great deal of processing power, the method of the present invention requires relatively little computation to perform the conversion and produces an output format which is logically suited to the physical means by which the printer operates.

Use of a two-color printer (e.g., a thermal printer), and particularly one utilized as a point of sale (POS) printer, provides various advantages and disadvantages. Advantages of such printers, and particularly a thermal printer, include a compact size which does not interfere with a cashier's workplace, as well as no need for a multi-colored ribbon or multiple ink cartridges each of which require time consuming, and potentially costly, replacement. The primary disadvantages of such printers is that they are limited to the production of images formed of two colors of ink plus a background color and therefore require the conversion of full color images to a two-color format. The two colors, referred to as the primary and secondary colors, consist, for example, of black and another color

respectively. A typical secondary color is red. The background color is formed of the paper substrate on which the printer prints and is usually white.

Quite simply, the present invention examines the individual pixels that make up the full color image and determines if the component of each pixel corresponding to the secondary color exceeds a predetermined threshold. If it does, an element of a secondary buffer is set to ON. If it does not, the element is set to OFF. In this manner, a secondary print buffer is constructed comprised of binary data: ON or OFF. Note that the data is binary and cannot assume an intermediate value such as one corresponding to the intensity of the secondary color. In a similar fashion, a primary print buffer is constructed and is likewise comprised of binary data. The resulting buffers are constructed such that corresponding buffer elements in both the secondary and primary print buffers are either both ON, both OFF, or the secondary buffer element is ON and the primary buffer element is OFF. Because of the physical process by which thermal printers work, it is not possible to process an instance in which a primary buffer element is ON and the corresponding secondary buffer element is OFF.

As a result of this process, the present invention provides for the efficient conversion of a full color image into two complimentary buffers comprised of binary data so as to facilitate printing on a two-color thermal printer.

Claim Rejections under 35 U.S.C. 102

The Examiner rejected claims 19, 25, 28-31 and 41-43 as being anticipated by Yamamoto et al. (US 5,734,484). With respect to claim 19 the Examiner noted that Yamamoto et al. discloses each and every element recited in the aforementioned claims. Specifically, the Examiner stated that Yamamoto et al. teaches a method of converting a full color image to a two color image by providing first dots defining said full color image and determining a plurality of printer commands representing second dot data to be printed in the two color image wherein the second dot data is in the form of primary color dot data, alternate dot data, and no print dot data.

Claim 19 is amended herein to more clearly define the novel subject matter of the present invention. Specifically, claim 19 has been amended to make clear that both the primary and secondary color dot data are binary (i.e., they are either "on" or "off"). In addition, "alternate color" has been changed to read "secondary color" in accordance with the language of the specification. Antecedent basis for this amendment may be found in the specification at page 5, lines 4-20 wherein there is described the binary nature of both the primary and secondary buffer elements. As all such elements can only assume a value selected from the group consisting of ON and OFF they are, by their very nature, binary. As a result, no new matter has been added. The binary nature of the buffers facilitates the printing of images on a media (such as thermal printer paper) which does not allow for varying intensities of the two colors.

In contrast, Yamamoto et al. does not teach the conversion of a full color image into a second image comprised of binary color data. Applicants concur with the Examiner's view of Yamamoto et al. as teaching "that color density signals subtracted by the subtractors are multiplied with coefficients which is then added by an adder to output a red image . . ." More specifically, Yamamoto et al. recites "Red image (R) = coefficient 11 * (Y – Min(YMC)) + coefficient 12 * (M – Min(YCM) + coefficient 13 * (C – Min(YCM))" (col. 5 lines 32-35). As is evident, Yamamoto recites a computationally intensive algorithm, the result of which is a red and a black image comprised of a plurality of integer or floating point values corresponding to the intensity of the pixels of the full color image which are expressly not binary in nature. Such an output requires additional processing to be printed on a two-color thermal printer which is, as described above, incapable of representing gradations of color intensity.

As Yamamoto et al. does not teach a central element of claim 19 as amended herein, namely the production of binary color dot data, claim 19 is believed to be in condition for allowance. As claims 25 and 28-31 depend upon claim 19, these claims are likewise believed to be in condition for allowance.

Claim 41 is amended herein in a manner similar to that of claim 19. For the reasons recited above, claim 41 is believed to be in condition for allowance. As claims 42 and 43 depend upon claim 41, these claims are likewise believed to be in condition for allowance.

Claim Rejections under 35 U.S.C. 103

The Examiner has rejected claims 20-24, 32, and 36-40 as being unpatentable over Yamamoto et al. in view of either Kouno Yoshimori JP 09-147235 or Ogura Tokihiko JP 09-308098.

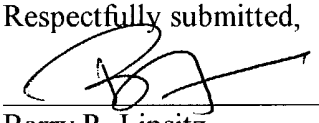
All of the rejected claims depend upon either amended claim 19 or amended claim 32. Claim 32 is amended herein in a manner similar to that of claim 19 to include the limitation of binary color data. As neither Yamamoto et al., Yoshimori, or Tokihiko, alone or in combination, teach or suggest this central element of claims 19 and 32, Applicants respectfully traverse the Examiner's grounds for rejection regarding all of claims 20-24, 32, and 36-40. Claims 20-24, 32, and 36-40 are therefore believed to be in condition for allowance.

Conclusion:

Further remarks regarding the asserted relationship between Applicants' claims and the prior art are not deemed necessary, in view of the above discussion. Applicants' silence as to any of the Examiner's comments is not indicative of an acquiescence to the stated grounds of rejection.

In view of the above, each of the presently pending claims is believed to be in immediate condition for allowance. Accordingly, reconsideration and allowance of each of the claims is respectfully requested. If there are any remaining issues that need to be addressed in order to place this application into condition for allowance, the Examiner is requested to telephone Applicant's undersigned attorney.

Respectfully submitted,



Barry R. Lipsitz
Attorney for Applicant(s)
Registration No. 28,637
Law Office of Barry R. Lipsitz
755 Main Street
Monroe, CT 06468
(203) 459-0200

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